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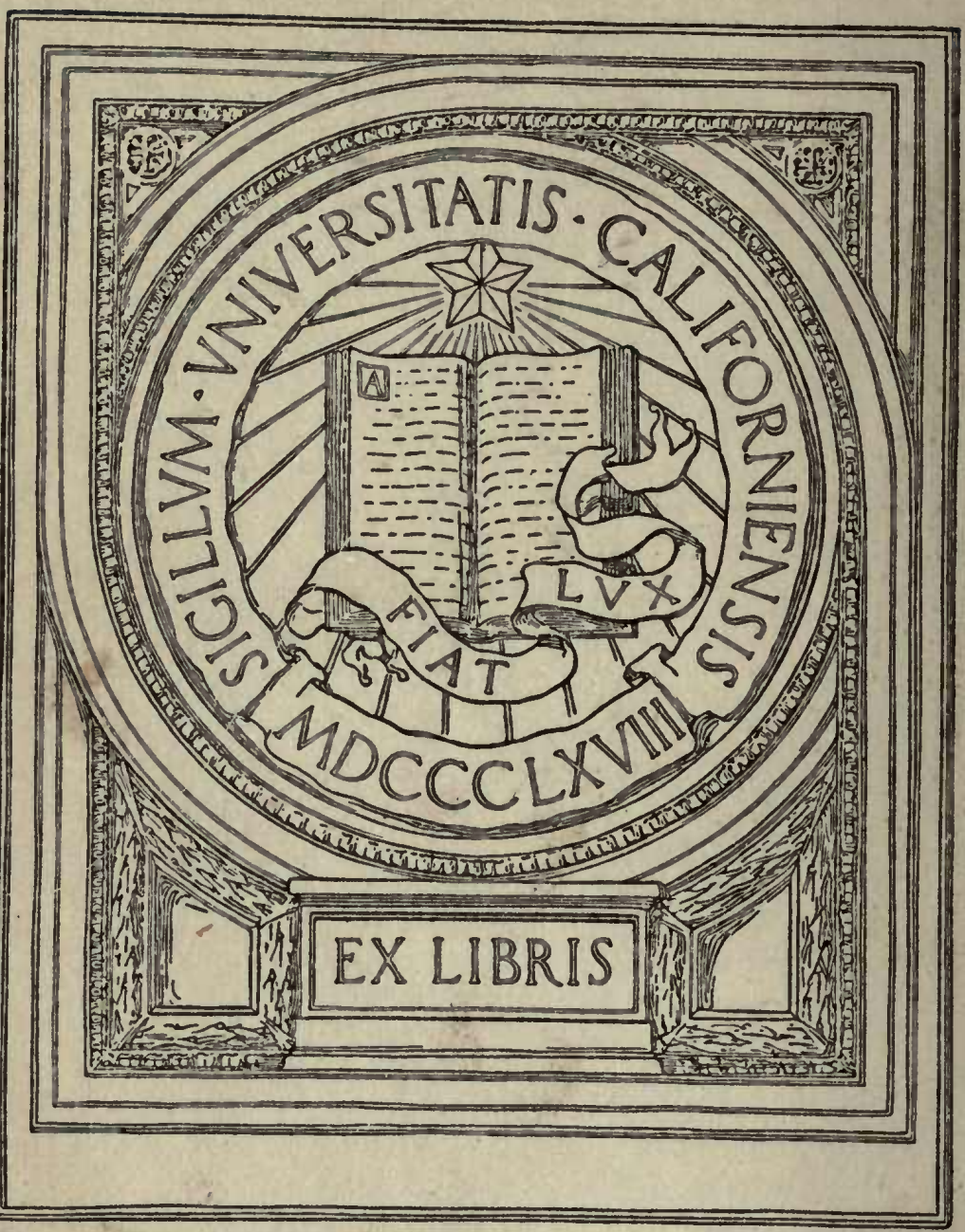

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OF THE

CONSTRUCTION AND CLASSIFICATION

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A

CATECHISM

OF

CONCHOLOGY,

CONTAINING A

PLEASING AND FAMILIAR
DESCRIPTION

OF THE

Construction and Classification

OF

SHELLS,

ACCORDING TO THE LINNEAN SYSTEM;

WITH

EXAMPLES OF EACH CLASS.

O who that hath an eye to see,
A heart to feel, a tongue to bless,
Can ever undelighted be
With Nature's perfect loveliness!

BARTON.

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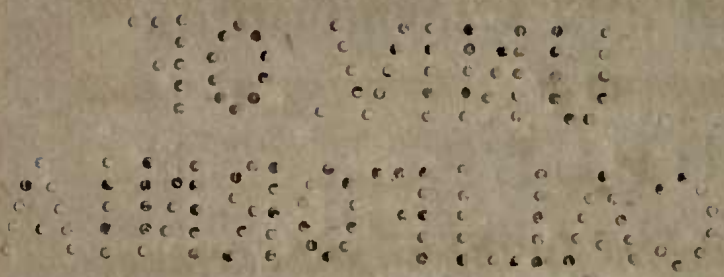

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ADVERTISEMENT.

The following pages are designed to comprize the Linnean Classification of Shells, with a general reference to such particulars in the habits and instincts of testaceous animals, as tend to render the science of Conchology equally interesting with that of Botany.

The Author is indebted for the scientific arrangement to the works of Mawe and Brooke; for the anecdotes connected with the different species, to the "Conchologist's Companion;" *and neither time nor labour has been spared, to render the Catechism as complete as its limits would permit.*

M94047

CATECHISM

OF

CONCHOLOGY.

CHAP. I.

OF CONCHOLOGY.

Q. What is Conchology?

A. Conchology or Testaceology is the science which treats of the structure, properties, and methodical arrangement of shells, the external testaceous coverings of molluscous animals.

Q. What kind of animals are they?

A. Creatures of a soft fleshy substance without bones, each of which are generally furnished with a muscle by means of which it adheres to the shell.

Q. What does the third order in the sixth class of the Linnæan system of nature comprehend?

A. This order includes all shells of a calcareous nature, that is, composed of carbonate of lime mixed with some gelatinous or gluey matter, and excludes such as are called crustaceous, in the covering of which phosphate of lime is a constituent part.*

Q. Is there no other difference between testaceous and crustaceous animals?

A. Yes. Testaceous animals inhabit their shells, to which they are partially attached; whereas the crustacea make one with theirs, each limb being invested with its own peculiar shield.

Q. Are shells generally found on land?

A. Shells are either terrestrial, or found in rivers, lakes, in shallows of the sea, or in the deeper beds of the ocean.

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* By a reference to "Pinnock's Catechism of Chemistry", the learner will become acquainted not only with the terms here used, but with the principles on which the combination of different substances are formed. In fact, without some knowledge of the first elements of chemistry, but little progress can be expected in the study of the other sciences more or less dependent on it.

Q. In what respect do they differ fromeach other?

A. A considerable difference is observable, according to the different situations which they inhabit: those which are not oceanic, being far more fragile and transparent than such as have to endure the rough beating of a boisterous sea. Many of those which inhabit still ponds and muddy ditches are scarcely able to resist the slightest pressure.

Q. How are the shells formed?

A. It appears from the accurate investigations of Leuwenhoeck and Reaumur, that an infant shell-fish is uniformly furnished with a testaceous coating, which gradually increases by means of a viscous exudation from the aperture or hinge round the circumference of each valve, and forms a coat of mail adapted to the exigencies, and proportioned to the shape of the wearer.

Q. This is very extraordinary. But why is it that this strong exudation condenses only on those parts where it is essential to the welfare of the animal?

A. Here investigation ends; the microscope

has done its office. It seems as if maternal nature delighted to baffle the researches of her sons, for the wisest of mankind would find it impossible to account for this extraordinary fact.

" Proud, scornful man! thy soaring wing
Would hurry towards infinity;
And yet the vilest, meanest thing
Is too sublime, too deep for thee!"

CHAP. II.

DIVISIONS OF THE ORDER TESTACÆA.

Q. What are the natural divisions of the order Testacea?

A. Multivalves, Bivalves, Univalves.

Q. What is the meaning of the word Valve?

A. By the word valve, is meant any single piece of calcareous substance, let the form be what it may, which serves as an habitation or protection, either partially or entirely, to a molluscous animal.

Q. What is meant by Multivalves?

A. Multivalves signify those shells which are composed of more than two pieces, as the Pholas. They are either *parasitical*, that is, attached to other substances as the genus Lepas, or unattached, as Chiton and Pholas.

Q. Of what do Bivalves consist?

A. Bivalves consist of two distinct parts united by an hinge, as the oyster.

Q. How are Univalves formed?

A. Univalves are formed of one entire part, as the common snail.

CHAP. III.

GENERIC CHARACTER OF MULTIVALVES.

Q. From what are the generic characters of the Multivalves derived?

A. From the situation and number of the valves.

Q. Describe the different parts of which Multivalves consist.

A. 1st. Basis; in the Chiton and Lepas, that part of shell which is affixed to extraneous bodies, either with or without a peduncle, or stem. In the Pholas, the part of the margin opposite to the summit of the beaks.

2dly. Ligamentum, Cartilage, the membrane which connects the valves.

3d. Limbus; Border, the marginal membrane of the Chiton.

4th. Operculum; Operculum, in Lepas, the lid which closes the vertical aperture of the shell, consisting usually of four triangular valves.

5th. Pedunculus; Peduncle, the tabular support of certain Lepades.

CHAP. IV.

MULTIVALVES.

Chiton.—Lepas.—Pholas

Q. Describe the generic character of the Chiton, or coat or mail.

A. The shells composing this genus are easily distinguished from all others, being of an oval form, somewhat resembling the common wood-louse. They cover the back of the animal, and are generally composed of eight pieces called valves, connected by an elastic cartilage, and surrounded by a narrow belt or margin, which is sometimes covered with scales.

Q. Describe the generic character of the Lepas, Acorn-shell, or Barnacle.

A. The shell is multivalve, apexed by the base, valves unequal, erect. Lepades are of various forms, though mostly resembling a truncated cone. They adhere by means of a gelatinous fluid which exudes from their bodies to rocks,

and stones, and often to the bottoms of ships, in such numbers as to impede their sailing, whence their name.

Q. What is the generic character of the Pholas or Stone-piercer?

A. The shell of the Pholas is spreading, and differently shaped, but with several smaller accessory valves, situated upon the hinge and posterior slope.* Hinge recurved (curved back), furnished with a tooth: the outer surface of the shell is rough, with points somewhat like a file.

Q. Where are the Pholades found?

A. In stones and wood, as their name, derived from the Greek, implies. They perforate the hardest substances by means of an instrument resembling a tongue, having previously softened them with a peculiar secretion which exudes from the body of the animal.†

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* For a particular account of this curious shell-fish, consult the "Conchologist's Companion."

† See next Chapter for the meaning of this word.

CHAP V.

GENERIC CHARACTER OF BIVALVES, WITH A *Description of their Component Parts.*

Q. I FIND the terms used in describing Bivalves very difficult to understand ; will you have the goodness to explain them to me?

A. Most willingly, if you will state them one by one.

Q. From what are the generic characters of Bivalves derived?

A. Generally from the hinge.

Q. From what the specific?

A. From the colour, form, or decorations of the shells.

Q. How are varieties formed?

A. From accidental variations in the tints or forms of shells.

Q. Have the goodness to explain the term

area, or anterior slope, and areolo, or posterior slope.

A. The first is that side of the beaks, or that space in which the ligament is situate. The second, of course, the other side of the beak.

Q. What are the apices or beaks?

A. They are the tips or extreme parts of the umbones or bosses, as they are termed by Conchologists, or rather of that part where the two shells meet.

Q. What are the Auriculæ, or ears?

A. Angular projections, either on one or on both sides of the beaks.

Q. Have the goodness to describe the base of a shell.

A. It is that part of the margin of the shell which is immediately opposite to the beak or summit.

Q. Where is the cavitas or cavity?

A. The inside of the shell.

Q. What is meant by the term margin?

A. It is the edge of the shell:—anterior, the space in which the ligament is situated; posterior,

the space on the other side of the hinge; superior, the space between the anterior and posterior parts.

Q. What is the cardo or hinge?

A. That part of the circumference in which the valves unite, or are attached to each other. It forms the thickest region of the shell, and is inwardly furnished with one or more teeth: it is said to be *compressed* when it is formed of one compressed tooth; *lateral* when placed on one side of the shell: *reflected*, when its edges are folded over the exterior margin; *terminal*, if situated at the extremity of the shell; and *truncated* if the beaks of the shell appear to have been transversely cut off, and the teeth of the hinge fixed to this part.

Q. What are muscular impressions?

A. Marks made by the muscles with which the animal adheres to the shell, as in the common oyster.

Q. What is the Dens, or tooth of a shell?

A. It is an acute projection within the hinge.

Q. What is meant by the Intestinum?

A. Internal ligature, or membranaceous tube,

by means of which some species of the genus Anomia adhere to different substances.

Q. What is the meaning of Labium?

A. It signifies in Univalves, the sides of the aperture; in Bivalves, the exterior edge of the valves.

Q. What is the Tinus?

A. A deep cut, as in the lip of the Nuren Babylonicus.

Q. I do not understand the meaning of the term Ligament.

A. It signifies a cartilage which closes the suture fixed between the internal and external lips of the shell, and connects the valves.

Q. Pray what does the word Limbus signify?

A. Circumference within the margin.

Q. What does Lunula, or Lunule mean?

A. A small crescent-shaped depression, on either side of the area or areolo.

Q. What are the Radii, or Rays?

A. Elevated striæ or lines tending from the centre of the shell to the periphery, or circumference.

Q. What is the Rima or Suture?

A. The interstice which separates the valves when the ligament is wanting, or the hollow which is covered by the ligament.

Q. What are the Squamulæ?

A. Scales.

Q. What the Striæ?

A. Elevated lines or furrows.

Q. What are the Tulci?

A. They are sometimes used, though perhaps improperly, to signify the same as Costæ—ribs.

Q. Does not the word Testa signify a shell?

A. Undoubtedly.

Q. What is meant by Æquilateral, or Inæquilateral valvæ or valves?

A. 1st. That the *anterior* and *posterior* sides of the valves are equal. 2d. The reverse.

Q. What is meant by *dextræ et sinistræ*?

A. Right and left.

CHAP. VI.

BIVALVES:
MYA, *or Trough Shell.*

Q. WHAT are the distinguishing characteristics of the Mya, Trough-shell, or Gaper?

A. Shell bivalve, mostly gaping at both ends: hinge seldom with more than one tooth, solid, thick, and spreading, proceeding from beneath the beak.

Q. Describe the form of the shells.

A. They are chiefly broader than they are long, and generally smooth, or slightly striated, (varied with channels). The hinge, in some species, is connected internally by an elastic cartilage, which in one valve is sunk *in a triangular* sinus or hole; and in the other is protected by a *broad tooth*. In others the cartilage is wanting, and the tooth varies in appearance, sometimes two-lobed, with one of the lobes slightly inserted. This genus is rather to be distinguished *by the*

size and thickness of the tooth, than by any assignable form.

In a few instances the hinge is destitute of a tooth, and the shell is only to be classed by other points of generic resemblance.

Q. Are the animal inhabitants of the Mya at all peculiar in their habits?

A. They burrow in the sand or mud, leaving a channel through which they thrust a slender proboscis, for the purpose of obtaining clear water.

Q. Does not a species of the Mya produce pearls?

A. Yes. The Mya Margatifera, an inhabitant of many of our own rivers, the Conway especially, which was anciently celebrated for its extensive pearl fisheries.*

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* Conchologist's Companion.

CHAP. VII.

BIVALVES:

SOLEN; *Razor-Sheath, or Knife-Handle.*

Q. WHAT are the distinguishing characteristsics of the Solen?

A. An oblong shell gaping at both ends. Hinge with awl-shaped teeth, bent backwards, often double, not inserted in the opposite valve; lateral margin obsolete (indistinct).

Q. Are the valves convex?

A. Yes. The length of the shells in this genus is another remarkable character, and many of them are extremely brittle.

Q. Is not the form of the shell beneficial to the inhabitant?

A. It is admirably adapted to assist the motions of the animal, which are exclusively in a perpendicular direction. It makes its way through the sand of the sea-shore to a certain depth, and thence again to the surface in quest of food.

Q How is this effected?

A. "By means of a fleshy and cylindrical appendage, which is capable of being drawn out to a considerable length and made to assume the shape of a spade or hook."*

Q. From what is the name derived?

A. From a Greek word, signifying a tube.

---

* Conchologist's Companion.

CHAP. VIII.

BIVALVES:
TELLINA; *Tellen.*

Q. WHAT kind of shells compose this genus?

A. Shells compressed towards the *anterior* slope, and often bent. Teeth of the hinge mostly three; the lateral side smooth in one valve.

Q. Are these the only characteristics?

A. The beaks are *very short*, and usually *lean towards the ligament*, which is *large*, and *covers* the *prominent margin* of the *suture*.

Q. Is it not difficult for beginners in the science to discriminate between the Tellina and Venus?

A. It is so; and therefore necessary to remark that the principal difference subsists in the *inclinations of the beaks*. If they at all *tend towards* the ligament, the shell belongs to the genus Tellina; likewise if any remote *lateral teeth* be discernible, and if the *anterior* slope be compressed into an acute wedge, shaped form, or crooked. But the

primary teeth are still to be attended to; for they constitute the best, though not always the most obvious criterion.

Q. Is there nothing else?

A. Observe that the bend or fold of the extremity of the compressed slope is, without any exception, towards the *left* valve; that is, towards the *right* hand of the observer, when the shell is placed upon its base, with the area in front.

Q. Where are the Tellinæ generally found?

A. In fine sand or gravel on the sea-shore, some of them in rivers and wet ditches.

CHAP. IX.

BIVALVES:
CARDIUM; *Cockle, or Heart Shell.*

Q. WHAT have you to tell me respecting the Cardium?

A. That the shell is nearly equilateral and equivalve, generally convex, longitudinally ribbed, channelled, margin-toothed; that there are two centre teeth under the beak in each valve, standing in contrary positions: in one valve side by side, in the other valve one before the other.

Q. Are these the only characteristics?

A. No. One obvious character of the Cardium is, that the shell is generally strong and thick, very convex, and mostly with strong, prominent, longitudinal ribs on the surface. The disk is usually convex, but sometimes much depressed, like a keel, or angular. The ribs and furrows of the two valves are so disposed as to alternate at the margin, and to lock acutely and firmly into each other.

CHAP. X.

BIVALVES:
MACTRA; *Kneading Trough.*

Q. I WILL thank you to tell me how I am to discriminate the Mactra from other bivalve shells.

A. By observing that the shells of this genus are *inequilateral* and *equivalve*; that the middle tooth of the hinge is folded with a small hollow adjoining, the lateral teeth being remote, and inserted into each other.

This genus is easily to be known by observing a hollow in both valves under the beak, between the teeth, serving to hold the cartilage, which is thus wholly external.

Q. Is there any thing peculiar in the form of the internal cartilage.

A. Yes. It is generally of a triangular shape, or of one tending to a three-sided prism, the acute angle of which is placed under the apex

of the shell. This conformation is beautifully adapted to the motion of the valves, and to the construction of the hinge.

Q. From what is the name of this genus derived?

A. From a Greek word signifying kneading-trough, though we can trace but little resemblance.

CHAP. XI.

BIVALVES:
DONAX; *Wedge Shell.*

Q. WHAT information have you to give me respecting the Donax?

A. That shells of this genus have their margins often crenated, or crenulate (having blunt teeth), with the frontal margin very obtuse. That the hinge has two primary teeth and one marginal, and that the ligament is external.

Q. Are there no other distinguishing characteristics of this genus?

A. Yes. The shells are nearly all triangular, inequilateral, concave on the anterior slope, and assume the form of a wedge. They generally gape a little at each end.

Q. From what is the name Donax derived?

A. From a Greek word signifying an arrow. The name is illustrative of the habits of this curious shell-fish. It darts into the sand with the

utmost celerity on the approach of danger; its sagittate shell being well calculated for penetrating quickly the yielding substance of the shore.

CHAP. XII.

BIVALVES:
VENUS; *Venus.*

Q. UNDER this genera, a variety of beautiful shells are included; will you have the goodness to point out to me their distinguishing peculiarities?

A. Most readily. The lips of the shells are incumbent on the front margin. The hinge has three approaching teeth; side ones, diverging from the tip. The area and areola are well defined. In this genus the beaks are uniformly, or with very few exceptions, turned *towards the posterior slope*, that is, *from the ligament*. By this character they are distinguished from many of the Tellinæ, which otherwise much resemble them. The shells are mostly thick and strong.

Q. Does the superior beauty of this kind of shell entitle it to the appellation of Venus?

A. Linnæus dedicated it to this fabulous divi-

nity, as being one of the most elegant productions of the island of Cyprus.

Q. Do you remember the beautiful lines I read to you some evenings since, in which the author of "The Martyr of Antioch" has referred to this beautiful shell, and the fabulous origin of the sea-born goddess.

A. "Thou mean'st the daughter of the holy Callius:
I once beheld her, when the thronging people
Prest round, yet parted still to give her way;
E'en as the blue enamoured wave, when first
The sea-born goddess in her rosy shell
Sail'd the calm ocean."

CHAP. XIII.

BIVALVES:

SPONDYLUS; *Thorny Oyster, or Artichoke.*

Q. DESCRIBE the peculiarities of this genus of shells.

A. The shell of the Spondylus is inequivalve and rough. The hinge has two recurved teeth, which are separated by a small hollow, sometimes eared. One of the valves is convex and thick, the other flat.

Q. Does not the Spondylus considerably resemble the Ostrea in its general appearance?

A. Yes the affinity between them is certainly very great, but the strong and well-defined teeth, which are peculiar to this genus, form distinguishing characteristics.

Q. Does not the Spondyli generally attach themselves to rocks?

A. They are found on marine rocks, at considerable depths in the ocean, from which it is

extremely difficult to separate them. They are often bored by Pholades, and insects of various kinds. The animal inhabitants are commonly eaten on the shore of the Mediterranean.

CHAP. XIV.

BIVALVES:
CHAMA; *Clamp, Clam, or Gaper.*

Q. How am I to distinguish the Chama from Bivalves in general?

A. By its coarse shell, and hinge furnished with a gibbous callosity, obliquely inserted in an inclined hollow. Also by observing that this callosity, or tooth, is either simple or crenate (blunt), and that it is occasionally double or triple.

Q. These characteristics hardly appear sufficiently descriptive.

A. I will notice some other peculiarities, which will enable you easily to distinguish the Chama. Some species of this genus are truncate, and gape on the posterior margin; and though all do not so, they agree in being *equivalve* and *subequilateral* (the anterior and posterior parts of the shell nearly equal), in having recurved

beaks, and no prominent lips. The form of the shells differs considerably, and no genus, perhaps, contains two species so dissimilar in outward appearance as Chama cor and Chama gigas: still they are linked together by the Linnæan bond of relationship, the hinge, to the peculiarities of which your attention must be particularly directed.

Q. Is not the Chama gigas a very large shell?

A. The largest in the order of Testacea. A manuscript in the library of the late Sir Joseph Banks notices a shell of this description, preserved at Arno's Vale, Ireland, the total weight of which amounts to 507 pounds. A shell of the same species forms the baptismal font at the church of St. Sulpice, at Paris, and was presented by the Venetians to Francis the First.*

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* Conchologist's Companion.

CHAP. XV.

BIVALVES:

ARCA; *Ark.*

Q. Is not the Arca easily to be distinguished by observing that the shell is inequivalve, and that the hinge is furnished with numerous sharp teeth, alternately inserted between each other, and most frequently placed in a longitudinal direction on the hinge?

A. This arrangement is peculiar to the Arca. You will also observe that in many species the Arca lies flatly between the remote beaks; that it is horizontal, or a little inclined; and also covered with the ligament in a manner peculiar to this genus.

Q. Are the shells generally alike in their forms?

A. No: they vary considerably. Some are oblong, others eared, and the surface is generally covered with a rough cuticle, or beard.

Q. The name is peculiar—from what may it be derived?

A. The name of the genus is taken from one of its species, which is supposed to resemble Noah's ark, Arca Noæ. With this the other species are connected, not by form, but by the construction of the hinge.

CHAP. XVI.

BIVALVES:

OSTREA; *Oyster, Scallop, or Pecten.*

Q. By what peculiarities is the Ostrea distinguished?

A. The shell is generally equivalve, somewhat eared. *Hinge without teeth.* Having a hollow cavity or sinus, and in many instances lateral transverse grooves or furrows.

Q. Are not the shells generally uninteresting?

A. By no means. The O. malleus resembles a hammer, and the O. folium, or Tree Oyster, presents the aspect of a withered leaf, and thus eludes the vigilance of birds of prey, as it generally adheres to the roots and branches of trees. In point of colour some of them are very beautiful. Those of the Red Sea present the tints of the rainbow.

Q. I should imagine, from the general appearance of the Oyster, that its animal inhabitant ranked very little higher than a vegetable in the scale of creation.

A. Such was formerly supposed to be the

case, but modern naturalists have discovered that this helpless creature is endowed with instincts admirably adapted to its confined operations.

Q. Why are Pectens called the butterflies of the ocean?

A. From the beautiful variety of their colours, and the faculty which they possess of darting rapidly through the waves. In fine weather they congregate together, and mount the billows, forming little fleets, with half their shells expanded to catch the breeze; the other, which contains the animal, remaining immerged below. When any foe appears, or a sudden squall begins to ruffle the surface of the deep, the shells are instantaneously shut, and the pigmy vessels disappear.

Q. I lately observed several of these shells engraven on a coat of arms: what did they signify?

A. That the ancestor of the person who bore them, had crossed the sea in his way to the Holy Land, or some distant object of devotion. This kind of shell was also worn by pilgrims,

"Who fixed the scallop in their hats before."

Q. The Pecten and Common Oyster are certainly not alike.

A. You are aware that each genus contains several species, which are again subdivided into families. The Pecten, or Scallop, belongs to the first and second division, and are distinguished from each other by the proportion of their ears.

Q. I am much interested by these curious anecdotes. Will you favour me with some additional ones?

A. My time will not admit of it. You will find them amply detailed in "The Conchologist's Companion," which treats particularly of the curious instincts of shell-fish in general.

CHAP. XVII.

BIVALVES:

ANOMIA; *Anomia, or Antique Lamp.*

Q. Is it not difficult to distinguish shells belonging to this genus?

A. Rather so; for they vary considerably in their form: most of them are, however, thin and brittle, semi-transparent, of a pearly texture, and

may be readily known by having one of the valves perforated. This perforation is for the emission of a ligature, by means of which the animal adheres to extraneous substances; and thus protects his brittle shell from being injured by the agitation of the waves.

Q. Will you have the goodness to describe the general appearance of the shell?

A. The shell is inequivalve, one valve flattish, the other gibbous at the base, with a produced or projecting beak, generally carved over the hinge, which has a prominent internal muscular impression, and a side tooth placed within; but in the flat valve, and on the extremity of the margin, there are two long rays for the base of the animal.

Q. Are the transparent shells of any use?

A. The ingenious Chinese use them as substitutes for window glass.

Q. What has given rise to the peculiar denomination of this genus?

A. The similarity which some of its species bear to an antique lamp.

CHAP. XVIII.

BIVALVES:
MYTILUS; *Muscle.*

Q. WHAT are the distinguishing characteristics of a Mytilus.

A. A rough shell, often affixed by a thick byssus or silky beard, to rocks or floating substances. A toothless hinge, distinctly marked, except in a few instances, with a subulate line (having a half-crescent form), excavated longitudinally.

Q. Are not the finest pearls produced by this kind of shell-fish?

A. Yes, they are. The pearl-bearing shell of the Indian fisheries is the Mytilus Margaritiferus: it is most abundant and in greatest perfection on the coasts of the Persian Gulf and of the Island of Ceylon. The term pearl-oyster is, therefore, incorrectly though commonly applied to the shells which principally produce pearls, for although they may be sometimes found in other species, the Mytilus Margaritiferus and the Mya Margaritifera, are pre-eminently those from which the pearls of commerce are obtained.

Q. By what means are pearls obtained?

A. Shells which contain them are fished up by divers, who plunge into the water, and tear them from the rocks to which they adhere. The Muscles are then thrown together in heaps, and when the animal inhabitant is decayed the pearls are easily separated. They are then selected, and sold to merchants, who disperse them throughout Europe and the East.

Q. Are not the finest pearls a perfect round?

A. Yes, and for this reason the Orientals term it "Margion," or a globe of light. Marvarid is also one of its Persian appellations, which signifies the offspring of light.

Q. Repeat the lines in which the poet Hafiz notices this beautiful gem.

A. "Learn from yon orient shell to love thy foe,
And store with pearls the wrist that works thee woe;
Free like yon rock from base vindictive pride,
Emblaze with gems the hand that rends thy side.
All nature cries aloud, can man do less
Than heal the smiter, and the railer bless?"*

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* Conchologist's Companion.

CHAP. XIX.

BIVALVES:

PINNA; *Fin Shell, or Sea-Wing.*

Q. How am I to distinguish the Pinna from shells of a similar description?

A. By observing that the shell is sub-bivalve, brittle, erect, gaping, throwing out a beard, or byssus. That the hinge is toothless, and that the valves are united into one.

Q. Is not the shape of the Pinna a peculiar one?

A. It is broad at one end, and gradually tapers towards the other. The valves are convex, equal, and connected on the side of the hinge by a membrane, in such a manner as to form in fact an univalve shell, bearing the appearance of a bivalve.

Q. Why has the Pinna been termed a marine silk-worm?

A. From the extreme fineness of the byssus, which closely resembles silk. Indeed a considerable manufactory of stuffs, &c. from the threads of the Pinna, is established at Palermo. It is mentioned in the work to which I have so frequently referred, that in the year 1754 a pair of

stockings were presented to Pope Benedict the Fifth, which, in consequence of their extreme fineness, were enclosed in a small box of an ordinary size, such a one as is used for holding snuff.

Q. What kind of animal inhabits the shell?

A. A blind slug.

Q. How can such a helpless creature procure food?

A. Nature uniformly redoubles her exertions in favour of the weak. A kind of crab-fish, naked like the Hermit, and very quick-sighted, is the constant companion of the Pinna. They live and lodge together in the same shell. When the Pinna has occasion to eat, it expands its valves, and sends out its faithful purveyor to procure food. If any foe approaches, the Crab returns with the utmost speed to his blind hostess, who receives him into her mansion, and thus escapes the rage of the enemy. When, on the contrary, the Crab loads himself with booty, he makes a gentle noise at the shell, which is then opened, and the two friends feast together on the fruits of his industry.

CHAP. XX.

GENERIC CHARACTER OF UNIVALVES, WITH A *Description of their Component Parts.*

Q. HAVING now completed a survey of bivalve shells, I will thank you to describe to me the component parts of univalves; and also from what the generic character is derived.

A. Willingly. The character which appears to have guided Linnæus in the formation of the genera in univalves, was the exterior figure of the shell, the columella, the aperture, and form of the mouth.

Q. Now will you have the goodness to give me an explanation of the wreaths or whorls?

A. The parts you mention are the circumvolutions of the spire around the columella.

Q. What is the columella?

A. It is the pillar, or middle column, about which the wreaths form their spiral circuit.

Q. Describe the *aperture*, or mouth (apertura) of a shell.

A. It is, as the term implies, the orifice, entrance, or opening of the shell, that part through which the animal protrudes itself.

Q. What is the apex?

A. It is the tip or summit of the spire.

Q. What are the articuli?

A. They are joints, or parts of the whole.

Q. Describe the basis, or base.

A. It is the opposite extremity to the apex; in some shells that part of the body which is next the aperture, in others the lowest part of the beak. In this sense it is either *emarginate*, indented by a deep canal, or *entire*, without indentation.

Q. What is the canalis, or canal?

A. It is a continuation or prolongation of the aperture along the beak, which forms a kind of gutter or groove.

Q. What part is the rostrum, or beak?

A. It is a narrow channel, formed by a gradual approach of the lips of the shell towards the base.

Q. Will you explain the meaning of the term costæ?

A. Costæ signifies ribs; keel-like processes reaching from the apex to the circumference of the shell.

Q. I will also thank you to explain the mean-

ing of the terms *digiti*, *dorsum*, *epidermis*, and *labium*.

A. Readily. *Digiti* signifies *claws*, or finger-like divisions of the outer lip.—*Dorsum* is the back of the shell, or the upper part of the body when laid on the aperture.—*Epidermis*, skin, a membranaceous covering of the shell, found on some but not on all species.—*Labium interius*, lip, the *internal* or columella margin of the aperture: *exterius*, *outer margin* of the aperture.

Q. What is an operculum, or lid.

A. It is a plate or door, with which some species close the aperture of their shells; it is either of a horny, testaceous, or membranaceous substance.

Q. What are the radii, or rays?

A. They are elevated striæ, or lines, tending from the centre to the circumference.

Q. Is not the spira, or spire, the upper whorls of the shell?

A. Yes: and the suturæ, or sutures, are the spiral lines of connexion between them.

Q. What is the Latin appellation of a shell?

A. Testa.

Q. Where are the *varices* situated?

A. They are longitudinal swelling sutures, formed in the growth of the shell, at certain distances on the whorls.

Q. Will you explain to me the meaning of *ventricose*, *vertex*, and *umbilicus*?

A. *Ventricose* signifies bellied.—*Vertex*, in the Patella, signifies the uppermost point of the shell. —*Umbilicus*, a hole in the base of the columella, visible underneath.

CHAP. XXI.

UNIVALVES:
ARGONAUTA; *Paper Sailor.*

Q. WILL you describe the form of this shell?

A. The shell is spiral, involute, membranaceous, *unilocular*, or without chambers.

Q. What has given rise to the name?

A. This genus has been denominated Argonauta, from a companion of Jason, in the celebrated voyage of the ship Argo. The art of navigation is supposed to owe its origin to the

expert management of this instinctive sailor; thus noticed by Pope in the following lines:

"Learn of the little Nautilus to sail,
Spread the thin oar, and catch the driving gale."

This curious shell-fish swims on the surface of the sea; the shells serve for a boat, a membrane which it extends at pleasure, for a sail, and two feet, or tentacula, as oars. On the approach of danger, this active little mariner suddenly hauls in his tackle, rapidly absorbs a quantity of sea water, and betakes himself to the fathomless abyss, his native dwelling.

CHAP. XXII.

UNIVALVES.

NAUTILUS; *Pearly Sailor.*

Q. IN what respect does the Nautilus differ from the Argonauta?

A. The shell of the former is *many-chambered*, while that of the latter is *without any*. The divisions are perforated and connected by a continued syphon, or pipe, formed of a thin testaceous matter, and lined with a membrane of the animal.

Q. Are the habits of the Nautilus as curious as those of the Argonauta?

A. Equally so: the animal inhabitant floats on the water with the assistance of tentacula and a membranaceous sail. It is frequently found reversed, with the shell upon its back.

Q. What says the author of the Conchologist's Companion, respecting this extraordinary shell-fish?

A. That it is a vessel which no human hand has formed, guided by no human skill; a striking proof, amid the terrors and the wonders of the deep, that whilst nothing is too great for the controuling power of Omnipotence, nothing is too humble for his protecting care!

CHAP. XXIII.

UNIVALVES:

CONUS; *Cone.*

Q. WHAT have you to tell me respecting the Conus?

A. That the shell is convolute and turbinate, or in other words, that the whorls turn round a lengthened cone, and that the belly of the shell

is large in proportion to the spire, which seems to proceed from the centre. That the aperture is effuse, having the lips separated by a gutter, length greater than the breadth, without teeth, entire at the base, pillar smooth.

Q. Does not the Conus resemble the Voluta and Trochus?

A. Yes, in some respects, but it may be readily known by observing that the Voluta has a *plaited* not a *smooth columella;* that the aperture of the Trochus is *transverse* (in a cross direction), and not *longitudinal;* and that in the Conus the conical form is *erect*, and not *inverted.*

Q. From what is the name derived?

A. From the similarity which its species bear to a cone.

CHAP. XXIV.

UNIVALVES:
CYPRÆA; *Cowry.*

Q. WHAT kind of shell is the Cypræa?

A. An involute (without a spire), subovate (nearly oval), obtuse and smooth; one aperture, effuse, open at both ends, linear (length of the

shell greater than its breadth), toothed on both sides. This genus is remarkable for the high polish which adorns it in its native state.

Q. Are the instincts of the animal inhabitant at all peculiar?

A. A very remarkable property has been ascribed to this shell-fish, namely, the power of quitting his tenement, and forming one more suited to his necessity. They live deeply buried in the sand, from whence, it is said, these little wanderers, crawl forth to expatiate upon the rocks, leaving their shells behind them for the benefit and instruction of conchologists.

CHAP. XXV.

UNIVALVES:

BULLA; *Dipper, or Bubble.*

Q. WHAT have you to tell me respecting the Bulla?

A. That the shell is convolute and unarmed with teeth; that the aperture is oblong, longitudinal, and entire at the base; and that the columella is oblique and smooth. It is, however,

necessary to observe, that as some species of Bulla approach nearly to Cypræa, Helix, Buccinum, or Murex, the most distinguishing characteristic *is an inflated egg-shaped form*. The name Bulla, a bubble, is descriptive of the peculiarity which characterizes the real offspring of the Bulla family.

CHAP. XXVI.

UNIVALVES:

VOLUTA; *Volute, or Wreath.*

Q. How am I to distinguish the genus Voluta?

A. By observing the shell is spiral, somewhat effuse, without a beak; and that the pillar is *twisted* or *plaited*, generally without lips or perforations.

Q. Does not this genus contain many apparently incongruous shells?

A. It does so, but yet still it is easily discriminated, because all shells are referred to it which possess a plaited columella.

Q. Is not the Voluta Pyrum, or pear-shaped, a valuable shell?

A. It is held sacred in China, and every pa-

goda contains one of these shells, which is used by the priest for administering medicine to the sick, or holding the sacred oil at the coronation of the emperor. They are sometimes elegantly carved, and used by the Indians for drinking cups.

The form of the elegant genus Voluta, naturally suggested its name, which signifies rolled up cylindrically.

CHAP. XXVII.

UNIVALVES.

BUCCINUM; *Wheel.*

Q. WHAT are the distinguishing characteristics of the Buccinum?

A. A univalve, spiral, swelling shell; an ovate aperture, ending in a canal turned to the right; with a short beak or projection; pillar-lip expanded.

Q. Why is the appellation of Buccinum given to this kind of shell?

A. It originated with Pliny, from the resemblance which this kind of shell bears to a trumpet. Indeed it is generally supposed to have

suggested that kind of instrument, as by breaking off, or making a hole near the apex, a trumpet is formed, from which a variety of sonorous sounds may be produced.

Q. Are not trumpets of this description used in North Wales?

A. They are so, and also in Lithuania, Muscovy, and the East, where the herdsmen frequently employ them in directing the motions of their cattle. For no sooner is an herdsman risen in the morning than he winds his horn, and the oxen, asses, mules, goats, and sheep, immediately leave their respective places of retreat, and assemble round their leader. He then advances at their head, and leads them into such pasturage as he thinks proper, for the day. A second signal conducts them to the waters; a third commands them home, when every one repairs to his shelter for the night. Isaiah refers to this ancient practice, "The ox knoweth his owner, the ass his master's crib; but Israel doth not know, my people do not consider."—xii. 18, 19.*

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* Conchologist's Companion.

CHAP. XXVIII.

UNIVALVES.

STROMBUS; *Winged, or Claw Shell.*

Q. WILL you describe the Strombus?

A. This shell is spiral, aperture much dilated, lip expanded, and *ending in a canal inclined towards* the left, or from the columella.

Q. Are these the only peculiarities?

A. No, a very striking one is the *sinus*, a deep cut in *the outer lip*, which is situated near *the base*, but is not at all connected with the channel of the rostrum or beak. This generally furnishes a better discriminative mark than the direction of the beak, which is not always evident. It must, however, be remarked, that *several species* do not possess the sinus, which are apparently Strombi, from the obliquity of the canal; but as this conformation is not found in any but a Strombus, it is a sure criterion of the genus where *it does exist*.

CHAP. XXIX.

UNIVALVES:

MUREX; *Rock, or Trumpet Shell.*

Q. WHAT are the characteristics of the Murex?

A. A spiral rough shell, often formed with longitudinal membranaceous sutures, aperture terminating in a canal, either *strait or turned up backwards*, and not *inclining either to the right or left.*

Q. Is not the peculiar form of the aperture a *distinctive feature?*

A. Yes, it is generally an oblong, or a perfect oval, and does not gradually contract into a canal, but abruptly opens into it, at the same, or nearly the same width which it retains throughout the whole length of the beak. The straitness of the rostrum is a much more questionable mark than the *outline of the aperture*, which, when once understood, cannot easily be mistaken.

Q. From what is the designation of this genus derived?

A. From a certain number of its shell, which are *rough* and *rock-like.*

Q. I believe the Tyrian purple, the costly

attribute of imperial dignity, was anciently produced from the Murex.

A. It was so; but the purpuræ of the ancients was not, however, confined to this one family of Testacæ, but certain species of Buccinum and other shell-fish also furnished it.

Ancient Lyrian coins sometimes bear the Murex and Buccinum, in commemoration of the Tyrian purple.

Q. Where are they generally found?

A. In almost every part of the world; they still constitute the chief riches of Nicoya.

"Swains on the coast the far-fam'd fish descry,
That gives the fleecy robe the Tyrian dye."

CHAP. XXX.

UNIVALVES:
TROCHUS; *Top Shell.*

Q. How am I to distinguish the Trochus?

A. By observing that the shell is spiral, and more or less conic; that the aperture is *four-sided*, and somewhat *angular*, or more round, having the upper side transverse and contracted, and the pillar placed obliquely.

Q. Is it not very difficult to distinguish the Trochi from the Turbines?

A. Yes, in some instances; but the most simple, though not an unexceptionable rule, is to consider all specimens as belonging to this genus which have *any angular tendency* in the contour of the mouth, and are, as to their general appearance TOP shaped, in conformity with the meaning of their name, derived from the Greek.

Q. What is the true form of the Trochus?

A. It is that of a *pointed cone*, capable of standing nearly perpendicularly, or but little inclined, upon the flattened base of the last whorl; the aperture *broader than long*, angular at the lower extremity of the columella, and having the carinate (having the form of a boat-keel) margin of the outer lip so situated as to be nearly horizontal when the shell is placed in an upright position.

CHAP. XXXI.

UNIVALVES:

TURBO; *Wreath, or Turban Shell.*

Q. How is the Turbo to be distinguished from the Trochus?

A. By observing that the Turbo has a *round*

aperture, or one inclining to ovate, and that the Trochus has an *angular one*. This peculiarity ought sufficiently to characterize the different genera, and it will be found almost universally to hold good.

Q. What is the form of the shell?

A. A spiral. The name of this genus is as closely connected with that of its predecessor, as are the individuals which severally compose them; Turbo signifying, like Trochus, any thing that whirls round; *a top*. Both genera are found among the rocks on craggy shores, and on the sand, after a storm has detached them from their accustomed refuge.

Q. Are not the shells of this genus very beautiful?

A. They are generally solid, ponderous, shining, and often elegantly variegated. A large and beautiful specimen, in the possession of Mr. Bullock, was valued at two hundred guineas.

CHAP. XXXII.

UNIVALVES:
HELIX; *Snail, or Spiral.*

Q. DOES the Helix differ considerably from the Turbo?

A. The shell is univalve, spiral, *subdiaphanous*, or transparent, and brittle. The aperture is contracted, semi-lunar (like a half-moon), or roundish. To which description it is proper to subjoin, that there is not the smallest columella lip in this genus, and that the body *uniformly* projects convexly *into the circumference of the aperture*. The whorls are generally continuous.

Q. What does the generic appellation signify?

A. It is derived from a Greek word, signifying a shell constructed with a spire or with circumvolutions of the whorls.

Q. Is not this kind of shell-fish eaten in foreign countries?

A. Yes, they are esteemed as delicacies in the Mediterranean. A large species were cultivated by the Romans in beds, as Oysters are at the present time; and they are supposed to have furnished the Israelites with food during their rapid flight from Egypt.*

Q. Are all the Helices land shells?

A. They are found in very dissimilar situations: a considerable number inhabit wet ditches, a few

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* Conchologist's Companion.

the sea; and the Violet Snail swims at liberty, by means of a cluster of small bladders, which it inflates at pleasure.

CHAP. XXXIII.

UNIVALVES:

NERITA; *Nerite, or Hoof Shell.*

Q. WHAT are the characteristics of the Nerita?

A. A spiral, and gibbous or smooth shell, rather flat underneath; semi-orbicular (half an entire circle), or semi-lunar (half-moon) aperture, having *uniformly* the *pillar lip*, or *columella*, STRAIT.

Q. Are not many of these shells extremely beautiful?

A. Yes, nothing can exceed the beauty and delicacy of the miniature painting with which many of the Neritæ are adorned.

Q. How are these beautiful colours produced?

A. The means of producing them must be sought for in the animals themselves. Their necks are furnished with pores replete with colouring fluid, which blends insensibly with the

exudations that form their shells, and thus occasions that exquisite variety in their testaceous coverings, which art attempts to imitate, but can never fully equal.

CHAP. XXXIV.

UNIVALVES:

HALIOTIS; *Sea Ear, or Ear Shell.*

Q. WILL you describe the Haliotis?

A. The Haliotis is an open ear-shaped shell, with a lateral and nearly hidden spire, in the first division, longitudinally *perforated with pores.*

Q. What is the signification of Haliotis?

A. It is derived from two Greek words, signifying *sea* and *ear,* and is thus denominated on account of its ear-like form. The animal is attached by so adhesive a property to the surface of the rocks, that it requires the utmost force to disengage it, though by a spontaneous action it is able to remove with facility from place to place.

CHAP. XXXV.

UNIVALVES:

PATELLA; *Limpet, or Dish Shell.*

Q. DOES not the Patella resemble a cone, though mostly without a spire?

A. It does so, and an attentive consideration of this peculiarity will sufficiently distinguish the Patella from the Haliotis. These curious shells, as the name Patella signifies, assume the shape of *various little dishes*, and are firmly affixed by their tenants to the rocks, with the apex uppermost.

Q. Do they leave their stations?

A. Occasionally, by means of a sort of leg, which is attached to the under surface of the animal. This appendage also embraces part of the interior, and when the animal has occasion to change its place of abode, it projects the foot from beneath the shell, which gently erects itself on one edge, as if to diminish friction, and by a sudden spring the animal actually advances to a considerable distance.

CHAP. XXXVI.

UNIVALVES:
DENTALIUM; *Tooth, or Tusk Shell.*

Q. WILL you have the goodness to describe the Dentalium?

A. The shell is strait, or nearly so, tubular (or like a tube), open at both ends.

Q. Is not the construction of the shell extremely simple?

A. Yes: they are all, more or less, as their name implies, like teeth or tusks, and are completely separated from the other tubular families by being entirely without any contortion, though somewhat curved.

CHAP. XXXVII.

UNIVALVES:
SERPULA; *Worm Shell.*

Q. WHAT kind of shell is the Serpula?

A. Linnæus defines it to be of a tubular form, gradually tapering, and generally adhering to other substances. To which we may add, that the end, and occasionally the whole shell, is twisted into a spiral form; which creeping and

tortuous character furnishes us with a clue to the meaning of the generic name, Terpo.

Q. Are the habits of the inhabitants at all peculiar?

A. They are little known, but in this genus, as well as in the preceding one, the animal has been supposed to live with little or no adhesion to his shell.

CHAP. XXXVIII.

UNIVALVES:

TEREDO; *Ship Worm.*

Q. WILL you describe the form of the Teredo?

A. The shell is tapering, flexuous, and capable of penetrating wood. One end is closed by *two hemispherical*, and the other by two *lanceolate valves*.

Q. Is not the formation of the Teredo very curious?

A. The two small hemispherical valves are attached in pairs to the fore and hind part of the animal; and at the smaller end of the tube are used as flood-gates, to admit more or less water, according to the wants of the inhabitant. The lanceolate valves are placed at an angle, and fur-

nished internally with a long, flat and curved tooth; probably intended to strengthen the head, on which this curious boring instrument is placed.

Q. Are not this kind of shell-fish very injurious to shipping?

A. They are so, unless proper precautions are taken by tarring the sides of the vessel, or sheathing them with copper. But, as the author of the Conchologist's Companion observes, "The evil which they produce is readily obviated by a little care and contrivance; but the good which they are appointed to effect is incalculably great."

Q. What good can they possibly do?

A. They consume decaying substances, such as planks of wood, and the wrecks of vessels, &c. and thus enable the waves to break them into small pieces. Were it not for their incessant labours we have every reason to believe that those mighty rivers

> "To whose dread expanse
> Continuous depth and wond'rous length of course
> Our floods are rills,"

would in time become impeded by the vegetable masses, and innumerable trunks and branches of large forest-trees, which are continually carried into them; a considerable proportion of which,

edifice, sabulum, fine gravel or sand. The Sabella is the last in the order of Testacea.

Q. I lament that our conversations on this interesting subject are now drawing to a close; allow me to detain you a few moments longer, to inquire in what does the difference subsist between live and dead shells?

A. Those are called dead shells which are thrown up by the ocean, when empty of their inhabitant. The term living explains itself; these are often drawn up in the nets of the fishermen.

Q. I shall shortly go to the sea-side, and will lose no time in applying the information which you have given me, and commencing a collection.

A. One thing; my young friend, I would forcibly impress upon your mind: let nothing induce you to adopt the barbarous, the savage custom of putting live shell-fish into cold water, and allowing them to boil over the fire as the means of killing, and then extracting their inhabitants. Throwing them into *boiling hot water* answers the purpose equally as well, and it appears that the life of the animal is immediately extinguished; whereas a different mode inflicts a

slow, excruciating death upon these innocent, unoffending creatures. I would also urge you to recommend the same mode to the shell collectors, pointing out to them the excessive and wanton barbarity of the method in general use. I would even go further, and refuse to purchase any shells, the inhabitants of which had been subjected to similar torture. I once knew a lady whose benevolent exertions entirely did away the barbarous custom of pegging live lobsters, which formerly subsisted on the western coast. If ladies and gentlemen would act with an equal firmness, they would frequently have it in their power to do much good, and not a little to diminish the aggregate of national cruelty, and consequently of national crime. For remember, my young friend,

" That many a crime, deem'd innocent on earth,
Is register'd in heav'n; and these, no doubt,
Have each their record, with a curse annex'd.
Man may dismiss compassion from his heart,
But God will never. When he charg'd the Jew
T'assist his foe's down-fallen beast to rise;
And when the bush-exploring boy, that seiz'd
The young, to let the parent bird go free;
Prov'd he not plainly that his meanest works
Are yet his care, and have an interest all,
All, in the Universal Father's love?"

THE END.

Cox and Baylis, Printers, Great Queen Street.

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PINNOCK'S CATECHISMS
Of the ARTS and SCIENCES.

The Proprietors of these Publications respectfully submit the following Opinion of the Lord Chancellor of England, (*the especial* Guardian of British Youth,) *as delivered by him in the Court of Chancery, July* 27, 1819.

Mr. WETHERELL having applied to the LORD CHANCELLOR to grant an INJUNCTION to restrain certain Booksellers from printing, publishing, and selling, *Pirated Editions of PINNOCK'S CATECHISMS*, the originals of which he denominated "useful Compendiums of Instruction for the Juvenile Classes of Society;" his LORDSHIP, on comparing the Spurious Copies with the Genuine Works, granted the Injunction; and, after having attentively examined the latter, was pleased to make the following important observation on them:— "*It appears to me that* ADULTS *might be greatly benefited by the instruction these Books contain,* AS WELL AS THE YOUNGER BRANCHES OF SOCIETY."

[*For a List of the Catechisms, see the Cover.*]

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